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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,507	12/19/2006	Akihisa Inoue	053128	4427

38834 7590 09/04/2009  
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP  
1250 CONNECTICUT AVENUE, NW  
SUITE 700  
WASHINGTON, DC 20036

EXAMINER
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ZHENG, LOIS L

ART UNIT	PAPER NUMBER
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1793

NOTIFICATION DATE	DELIVERY MODE
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09/04/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/552,507	<b>Applicant(s)</b> INOUE ET AL.	
	<b>Examiner</b> LOIS ZHENG	<b>Art Unit</b> 1793	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Claims***

1. No claim amendments are made in view of applicant's response filed 15 May 2009. Therefore, claims 1-4 are currently under examination.

### ***Status of Previous Rejections***

2. All previous rejections are withdrawn in view of applicant's persuasive arguments and effective declaration under 37 C.F.R. § 1.131 filed 26 November 2008, which overcome "Hydrogen Absorption of Nanoscale Pd Particles Embedded in ZrO<sub>2</sub> Matrix Prepared from Zr-Pd Amorphous Alloys", Yamaura et al., Journal of Materials Research, Vol. 17, No. 6, pages 1329-1334, June 2002(Yamaura).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baiker et al. US 4,916,109(Baiker), or alternatively, Baiker further in view of "Crystallization of amorphous Zr-Ni alloys in the presence of H<sub>2</sub>, CO, O<sub>2</sub>, N<sub>2</sub> and argon gases", Aoki et al., Journal of Materials Science, Vol. 21 pages 793-798, 1986(Aoki).

Baiker teaches a process to form an amorphous palladium zirconium oxide material, such as Pd<sub>33</sub>(ZrO<sub>2</sub>)<sub>67</sub>, used a catalyst for oxidation of CO (abstract, col. 1 lines 55-57), comprising forming an amorphous PdZr alloy by melting and rapid cooling at a

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cooling rage of  $10^6$ - $10^9$ °C/s(col. 1 lines 58-64), followed by heating the PdZr alloy in an oxygen-containing gas stream at a temperature between 150-350°C to activate the PdZr alloy, which results in palladium particles in  $ZrO_2$  matrix(col. 2 lines 14-33).

Example 2 of Baiker further teaches that a  $Pd_{33}Zr_{67}$  alloy is activated in an air stream at a temperature of 280°C (col. 5 lines 16-19, 53, Tables 1-2, col. 3).

Regarding claims 1 and 4, even though Baiker does not explicitly teach the claimed third metal M in the alloy composition, the  $Pd_{33}(ZrO_2)_{67}$  alloy as taught by Baiker is still substantially the same as the claimed  $Zr_{100-a-b}Pd_aM_b$  alloy material since b, which has a claimed lower limit of  $> 0$ , may be infinitesimal. In other words, zero amount of the claimed third metal in the PdZr alloy of Baiker does not overlap the claimed lower limit of infinitesimal amount of the claimed third metal, however, such differences are so small that one of ordinary skill in the art would have expected the PdZr alloy of Baiker to have the same properties as the claimed  $Zr_{100-a-b}Pd_aM_b$  alloy.

In addition, since Baiker teaches an PdZr alloy forming process that is the same as claimed and uses a PdZr alloy material that is substantially the same as claimed, one of ordinary skill in the art would have expected the  $ZrO_2$  matrix formed by the process of Baiker to be ultrafine particles as claimed. And the PdZr alloy as taught by Baiker is capable of functioning as a hydrogen storage alloy as claimed.

Alternatively, Aoki teaches that zinc based alloy such as ZnNi and ZnPd amorphous alloys absorbs considerably quantity of hydrogen and also acts as catalyst for hydrogenation of carbon monoxide(introduction). Since ZnNi and ZnPd are functionally equivalent hydrogen absorbing material and catalyst material, one of

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ordinary skill in the art would have found it obvious to have used a combination of Zn, Ni and Pd in the metal alloy of Baiker and achieve the same expected success of obtaining a hydrogen absorbing material and/or a catalyst material.

Regarding claim 2, since Baiker or Baiker in view of Aoki teaches a substantially the same alloy composition and is produced by the same heat treatment step and forms the same amorphous alloy with dispersed ultrafine metal and  $ZrO_2$  particles as claimed, one of ordinary skill in the art would have expected the amorphous hydrogen storage alloy material of Baiker or Baiker in view of Aoki to have substantially the same hydrogen storage amount of 2.5 wt% or more in a weight ratio relative to Pd contained in the hydrogen storage alloy material as claimed.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baiker in view of Aoki.

The teachings of Baiker in view of Aoki are discussed in paragraph 4 above.

Regarding claim 3, one of ordinary skill in the art would have found it obvious to have used the hydrogen storage alloy of Baiker in view of Aoki in any suitable applications wherein a hydrogen storage alloy is required, including the claimed hydrogen storage/transporting container.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LOIS ZHENG whose telephone number is (571)272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/  
Supervisory Patent Examiner, Art  
Unit 1793

LLZ